M216 Multiplexer

User manual

V 1.0

Beijing Compunicate Technology INC

About this manual

This manual describes the installation, setup and operation of the Compunicate M216 multiplexer in detail. Please read it carefully to make sure you can operate the multiplexer correctly.

Notice:

Please use the cable of good quality and make sure the connector is in good condition

Please do not use the power supply that doesn't match the requirement

Please do not open the machine cover

Content

PREFACE **5**

CHAPTER1 INTRODUCTION **6**

1.1 INTRODUCTION 6
1.2 WORKING PRINCIPLE 6
1.3 FUNCTION 7
1.4 TECHNIQUE PARAMETER 7
1.5 USE SURROUNDING 7

CHAPTER2 INSTALLATION **9**

2.1 INSTALLATION DIMENSION 9
2.2 PORT DESCRIBE 10

CHAPTER3 OPERATION **11**

3.1 M216 BASIC OPERATION 11
3.1.1 Setting network address *11*
3.1.2 Initialization *12*
3.1.3 Logon *12*
3.1.4 Read information *14*
3.1.5 Program multiplex *16*
3.1.6 Export/Import configuration *20*
3.1.7 Clear all ports information *20*
3.1.8 Lock PID *20*
3.2 M216 ADVANCED OPERATION 21
3.2.1 Transfer service information *21*
3.2.2 Edit NIT *24*
3.2.3 Add private description *26*
3.2.4 Stream assembled *27*

APPENDIX A M216 PANEL OPERATION INTRODUCE **28**

A-1 FRONT PANEL DESCRIBE 28
A-2 MENU STRUCTURE 29
A-3 KEYBOARD LOCK 31
A-4 NETWORK ADDRESS 32
A-5 OUTPUT NUMBER 33
A-6 TEST MODE 34
A-7 MODIFY PASSWORD 35

A-8 MASTER RESET 36
A-9 VERSION INFO 37
A-10 ALARM INFORMATION 38

APPENDIX B NOUN ABBREVIATIONS 39

Preface

Beijing Compunicate Technology Inc is one of the leading high-tech companies in China, which has the end-to-end technology of DVB. We first developed and manufactured the digital television head-end devices compatible with the standard of DVB such as encoder, multiplexer, DVB video server, the IP/ DVB gateway, DVB condition access system and IP condition access system approved by broadcasting bureau. "The delivering and receiving system of the digital video broadcast" won the honor of national science and technology award in 2000; this is also the highest award a DVB enterprise ever received.

M216 multiplexer is the latest product from communicate Inc. This manual introduces M216 multiplexer's installation and usage in detail; hope it will help you to use this product proper.

Attention: all rights to modify the manual without notifying in advance are reserved, including the rights of maintaining the accuracy, sufficiency and integrity of the information. No legal responsibility shall be taken by our company towards any harmful consequences caused by behaviors violating the manual. Besides, only users through legal purchase can use our after-sales services. Meanwhile users are suggested to browse our website so that the latest information can be captured and the better after-sales services can be enjoyed.

Chapter1 Introduction

1.1 Introduction

M216 is a kind of multiplexer with DVB standard transport stream, it has function of real-time video stream multiplex and re-multiplex. The M216 can pack 16 inport ASI SPTS or MPTS to 1 or two MPTS stream. It's multiplexing of the base band signal and additional data is compatible with ISO/IEC-13818 standard and its output interface is the standard DVB ASI interface. It connects with network manage support TCP/IP protocol, the Ethernet adopt RJ45 port.

1.2 Working principle

[Principle figure]

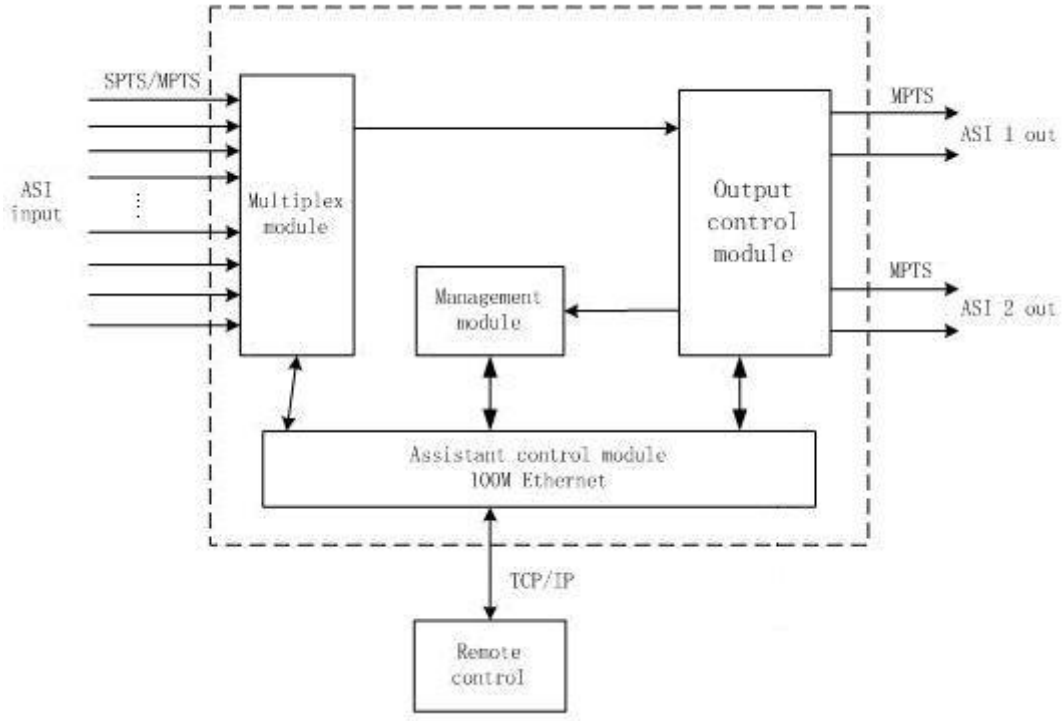


Figure1-1

[Working principle explain]

(1) The multiplexer accept 16 MPEG-2 SPTS or MPTS input and output two MPEG-2 transport stream (MPTS). It filters out the empty packet or unneeded packet, and change the PID (packet identity).

(2) Obtain the PSI (Program Specific Information) and SI (Service Information) and integrate them with local data.

(3) The M216 connect with network manage soft through TCP/IP protocol.

1.3 Function

- Multiplexing to SPTS (single program transport streams) or multiplexing to MPTS (multi program transport streams), MPTS supports all-chosen or part-chosen.
- Support two different outport.
- Low time delay. The delay for MPEG-2 Video program is less than 100ms.
- Providing PCR check
- Support DVB data broadcast.
- Support remote upgrade of the software.
- Real time monitor input status.
- Port PID monitor function, you can customize monitoring time and port.

1.4 Technique parameter

- PCR: < 100 ns
- Input interface: ASI Interface,BNC
- Input interface impedance: 75Ω
- Input interface bit rate（max）: 180Mbps
- Input select PID num（max）: 120
- Input program num(max): 100
- Input packet length: 188or 204byte
- Output interface ： ASI Interface,BNC
- Output interface impedance: 75Ω
- Output packed length: 188 or204byte
- Total output rate（max）: 180Mbps
- Power supply: 220VAC±10%,50Hz
- Power: 30W
- Weight: 4Kg
- Dimension: 450*430*44（deep*wide*high）mm

1.5 Use surrounding

- Working temperature: 0～45℃

- Working humidity： 5～80%
- Storage temperature： -20～70℃
- Storage humidity： 5～90%

Chapter2 Installation

2.1 Installation dimension

Each of equipment should keep down 1U（44mm）space, machine dimension of equipment is shown as figure2-1.

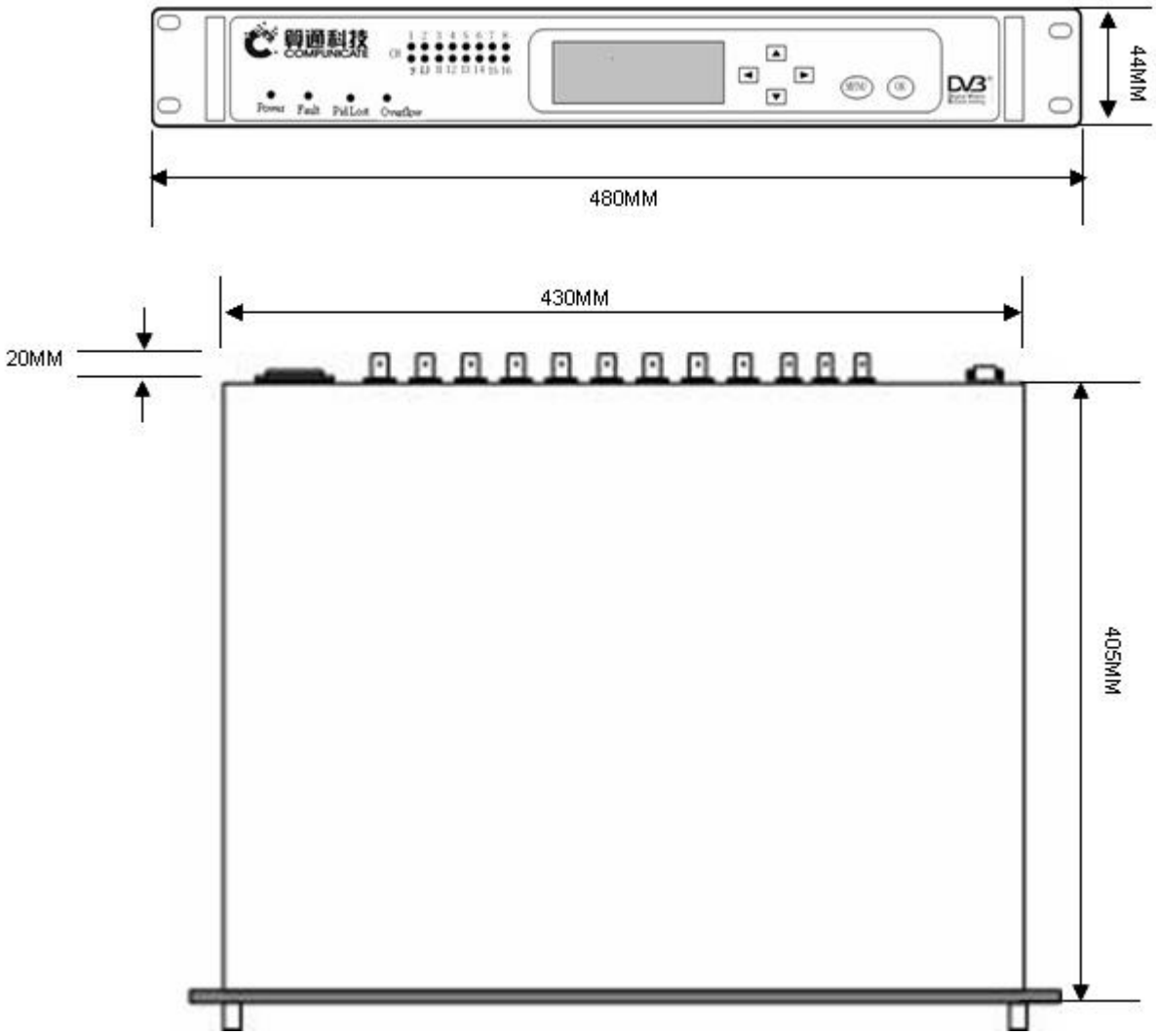


Figure 2-1

2.2 Port describe

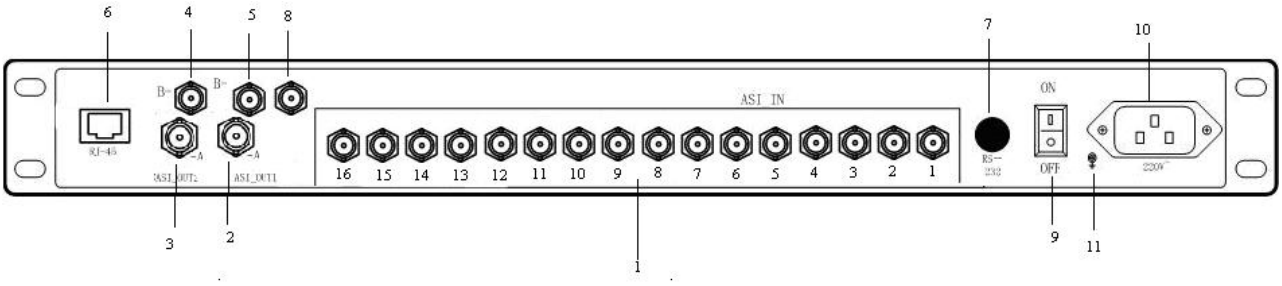


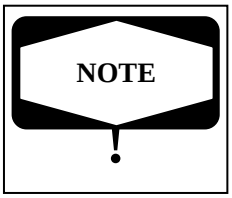
Figure2-2

Figure2-2 shows rear-panel map of equipment, port describe is shown:

1 ASI input channel（from1 to 16）, input SPTS or MPTS with DVB standard, 75ΩBNC.
2 ASI output 1, multiplex output, 75ΩBNC.
3 ASI output 2, multiplex output, 75ΩBNC.
4 The same as to ASI output 2.
5 The same as to ASI output1.
6 RJ-45 port, network control. The customer can manage the multiplexer via any PC in the LAN or WAN.
7 RS232 port, it is used upgrade and test locally.
8 ASI ring outport.
9 Power switch.
10 Power supply.
11 GND.

Note: output1 is different or same with output 2

Chapter3 Operation



The multiplexer only operate some simple configure by front panel, advice using network manage software. Once use the network manage software, if use the network software, please do not operate front panel.

3.1 M216 Basic Operation

The section introduce the M216 operation step, from table3-1, you can know operation step come down to some basic apply.

Table 3-1 M216 basic operation flow:

Step / Appliance	First	Second	Third	Fourth	Fifth
Installation	Setting network address	Initialization	Logon	Reading information	Program multiplexing
Change input port transport streams	Initialization	Logon	Reading information	Program multiplexing	
Change output program parameters	Logon	Reading information	Modify parameters		
Status monitor	Logon	Reading information			

3.1.1 Setting network address

- *Every equipment has different IP address in the network*
- *You must configure network address by front panel at first*

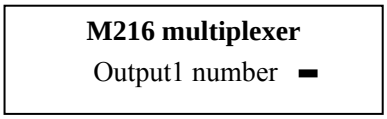
Configure network address is shown in appendix A－4.

3.1.2 Initialization

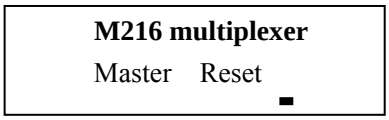
- *The initialization of multiplexer maybe lose some Parameters and interrupt transition*
- *The initialization of multiplexer is used the first installation or input streams changed or work status is abnormal.*

Initialization step is shown as following:

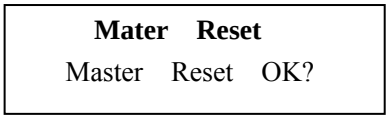
1、 Click" MENU", enter into main menu.



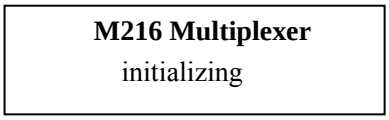
2、 Click ↑ ↓ key to move 'master reset'.



3、Click 'OK' key to enter the following figure.



4、Click "OK" key to finish initialization, the interface is shown as following figure.



5、At the same time, initialization can be operated by network manage, logon "M216"network manage process, click "", 'configured DVB-SI to output', then the initialization is finished.

3.1.3 Logon

1) Double click

,open the M216 network management interface, it is shown as figure3-1（You need to copy the M216 network management software carried by CD-ROM directly to the computer）.

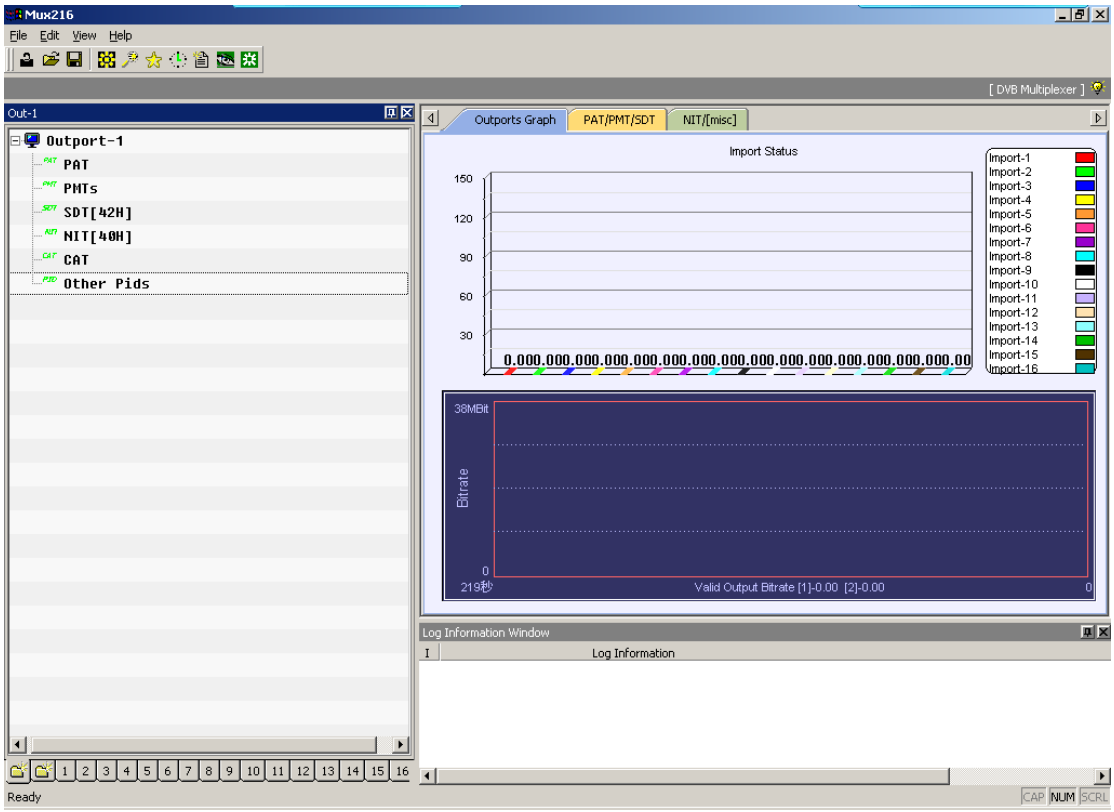


Figure 3-1

2) Right click ‘ ’, it will be displayed as following figure3-2, click the M216 IP address (setting the IP address can be seen on ‘setting network address’ chapter) on “device ip”. If search the multiplexer IP address, fill in IP address on “Broadcast IP”,then click “Search”, if the mux IP address lie in the same network, the “device ip” will display the mux IP address,‘usename’is dvb and‘password’is dvb, then click‘OK’.

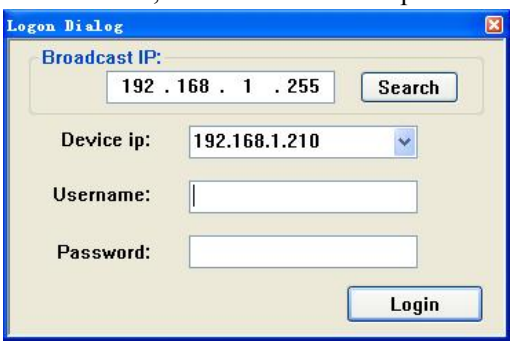


Figure 3-2

If logon successfully, the interface will be displayed as figure 3-3

Figure 3-3

If click “search”, the “device ip” do not display the IP address, check the mux IP address is same as the “broadcast IP” network address range, or if the network line connect correctly.

3.1.4 Read information

After logon the M216 successfully, click , the M216 start to read inport information., at the same time the network interface can not be operated, after finish reading you can operate the M216 other function.

[Bit stream control]

Click “Outports Graph” in the figure3-1, it will be displayed as following figure3-4.

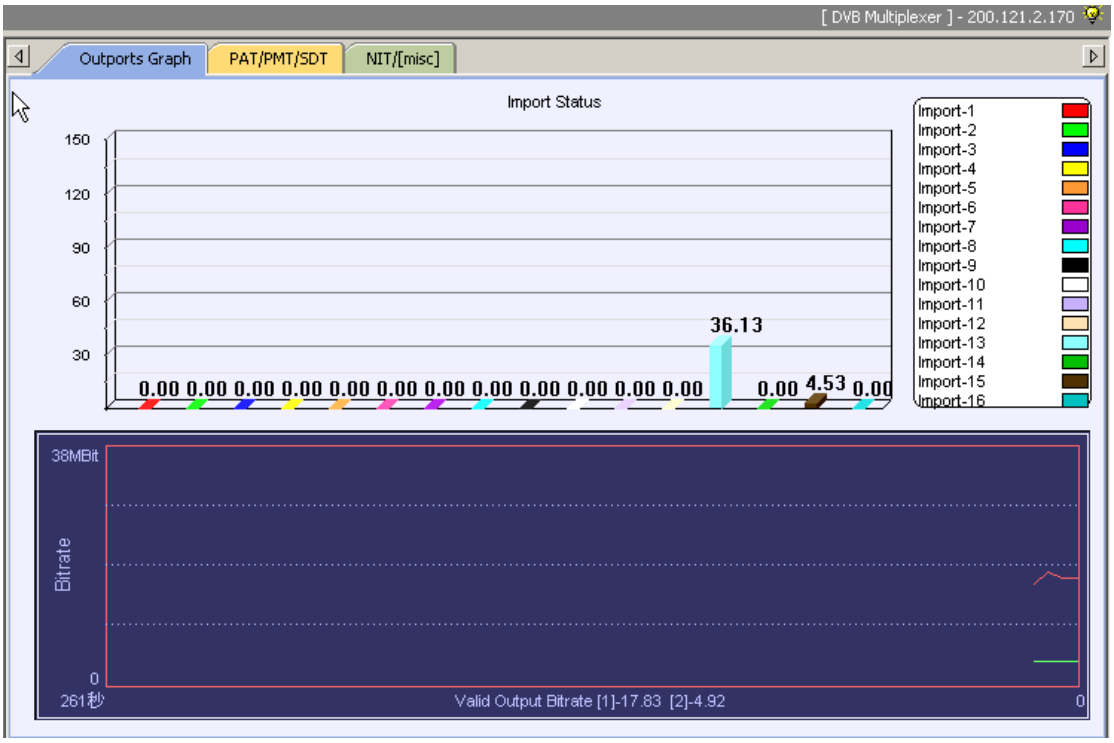


Figure 3-4

Above the figure3-4, there are16 color histograms, it show 16 inport bitrate. Seen the figure3-4, in the blue

area, it will display the M216 current valid output bitrate.

Note: the output bitrate is not total bitrate, the total bitrate is unchangeable.

[Program parameter information]

Through click figure3-4, it is shown below left side the window. The interface is show as figure3-5.simply analyzes outport or 16 inport streams.

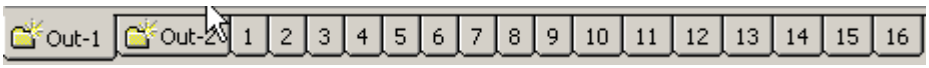


Figure 3-5

For example select import1,the interface is following as figure 3-6.the import include PAT、PMT、SDT、NIT、CAT and All Pids.

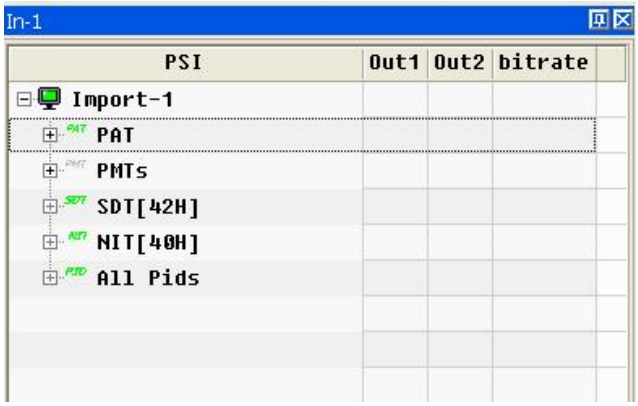


Figure 3-6

Click‘+’before any item, such as the figure 3-7.the PMTs have eight PMT, it show the import-1 have eight program streams and every Pid transmit bitrate in Pid.

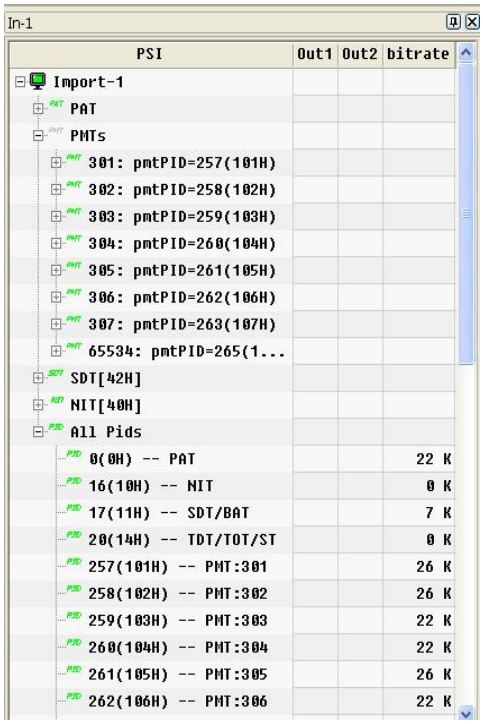


figure3-7 note:
301：pmtPID=257(101H)

301:Program number
257: algorism PID
101H: Hex PID

Figure 3-7

3.1.5 Program multiplex

Output program number lie on total effective bitrate, no higher than setting total output bitrate, between the effective bitrate and total output bitrate have about 2Mbps space, it use to transfer CA、SI information and so on.Only modify yellow area parameters

After logon the M216 network manage process and read information, multiplex the program streams and configure streams parameter.

3.1.5.1 Select port

Left click input port, for example select In-1 port, the interface is shown as figure 3-8.

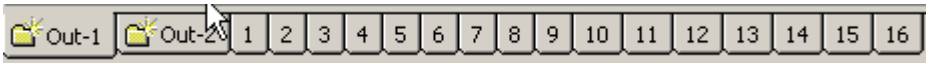


Figure3-8

3.1.5.2 Program transfer

Note：Subscribe may select input program to output in out1 or out2

Under PMTs table, right key click program which need to transfer, left key click, it will be shown as figure3-9, select 'transfer', then right key click to ok.at same time the interface will display'Y'.such as figure3-9, program number 301 output on outport2 and outport1.Repeat operation, finish to transfer program which need to be tranmited, then click out-1 or out-2, it will be displayed, such as figure3-11.

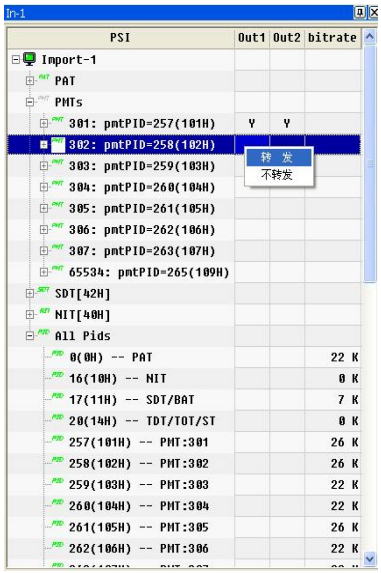


Figure 3-9

Seen from figure3-11, some programs which had been transferred from import will be displayed in the PMTs, click '+' before program number, the program include video stream, audio stream and so on. when click + before PMTs in import, it may include some PIDs which have "? "symbol. such as figure A, "? "show the M216 read some unknown PIDs, these PIDs may be deleted, its will not effect output and transmit.

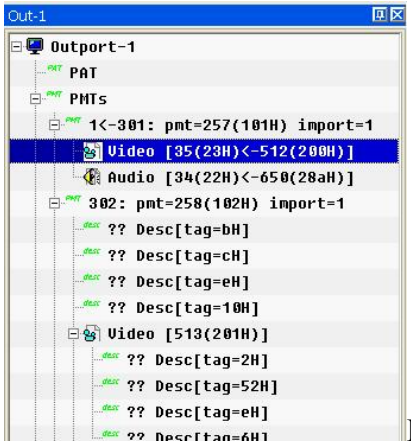


Figure A

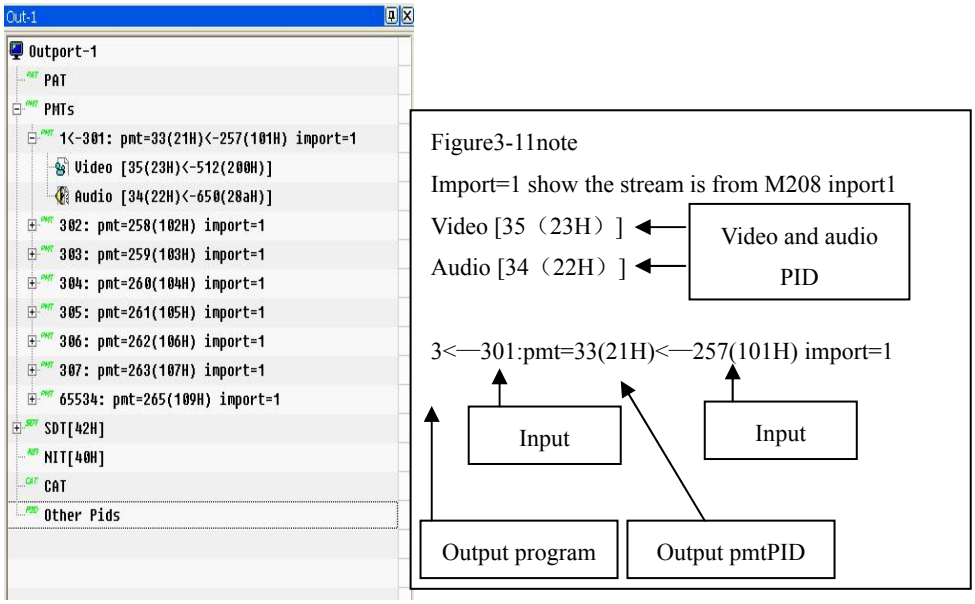


Figure 3-11

3.1.5.3 Setting PMT

Left click ‘PMT’ in one output, such as figure3-12, these parameters can be modified in yellow area. such as PMT_PID、progarm_number、PCR_PID, elementary_PID and so on. These parameters value which its lie‘<—’left side can be modified. elementary_PID include Video_PID and Audio_PID, when select video stream about figure3-12, the elementary_PID show video PID, otherwise Audio PID.

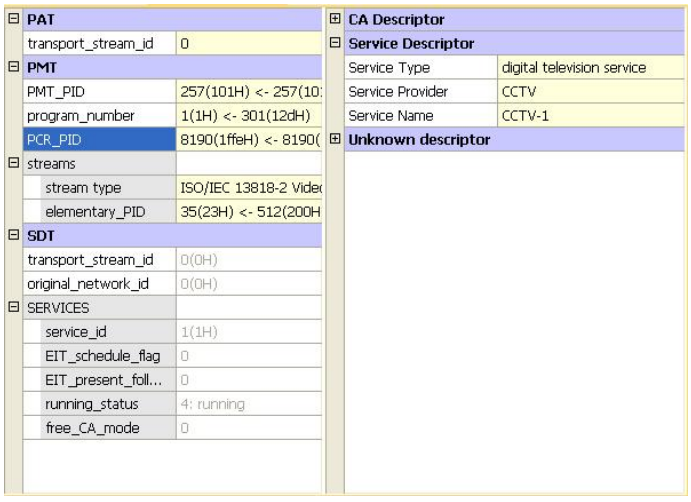


Figure 3-12

Note: any PID must to be modified differently.

3.1.5.4 Setting SDT

Select SDT left side of figure 3-13, corresponding right side to set transport_stream_id and original_network_id. Transport_stream_id is be assigned according to 1, 2...., it show transport stream1, 2...., original_network_id suggest to select'0'.

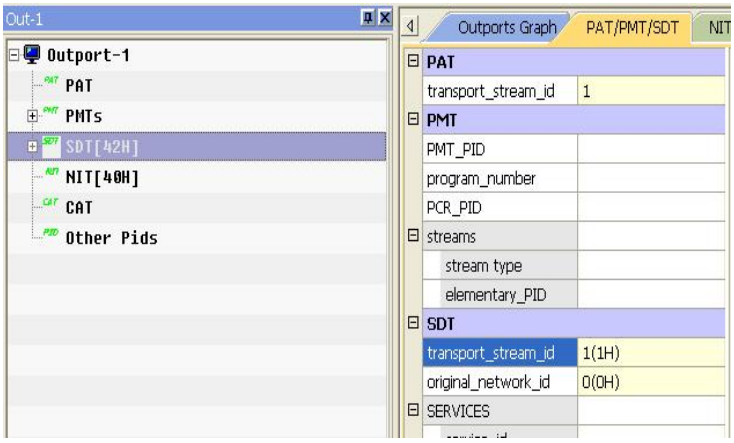


Figure 3-13

3.1.5.5 Setting NIT

Left click 'NIT', such as figure 3-14,configure network_id and Output Parameters.network_id suggest to select '0',the same as original_network_id.in same network all of multiplexer is same.

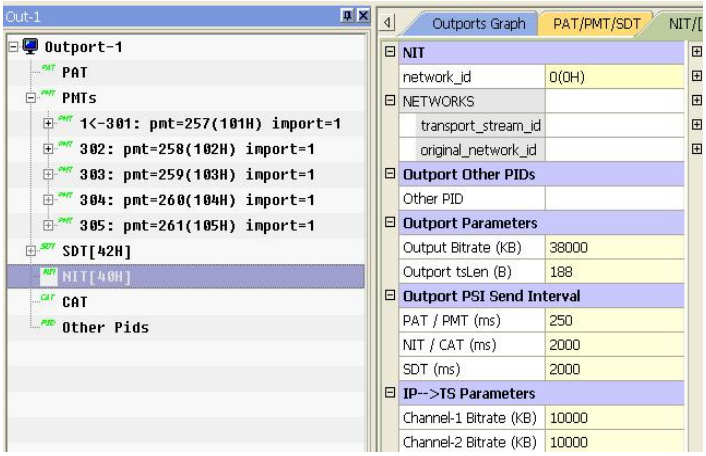


Figure 3-14

About Outport PSI Send Interval, suggest to select default value, the value is set by DVB standard.

Note: the original_network_id in SDT is the same as network_id in NIT, suggest to select"0" , the netword_id of these multiplexer which lie in the same network are same.

Make sure the parameter configure, click ' ''write configure information', save the parameters to the M216,even though the M216 is cut power supply, the parameter can not be lost.

3.1.6 Export/Import configuration

Export/Import data is back-up operation which is used easy to query.

a) Click 'Save', to save the configured M216 parameters to the local computer, export M216 parameters for future use.

b) Click 'Open', to import the saved parameters to M216, use to send the parameters to M216, restore the previous configuration to facilitate the inquiry.

3.1.7 Clear all ports information

After click of the , there display a figure as follow, click "Yes" to clear program of all input port.

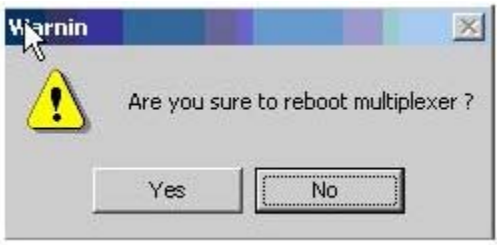


Figure 3-15

Note：This button normally used when program information read from ASI stream is incomplete.

3.1.8 Lock PID

Click to eject a figure as follow:

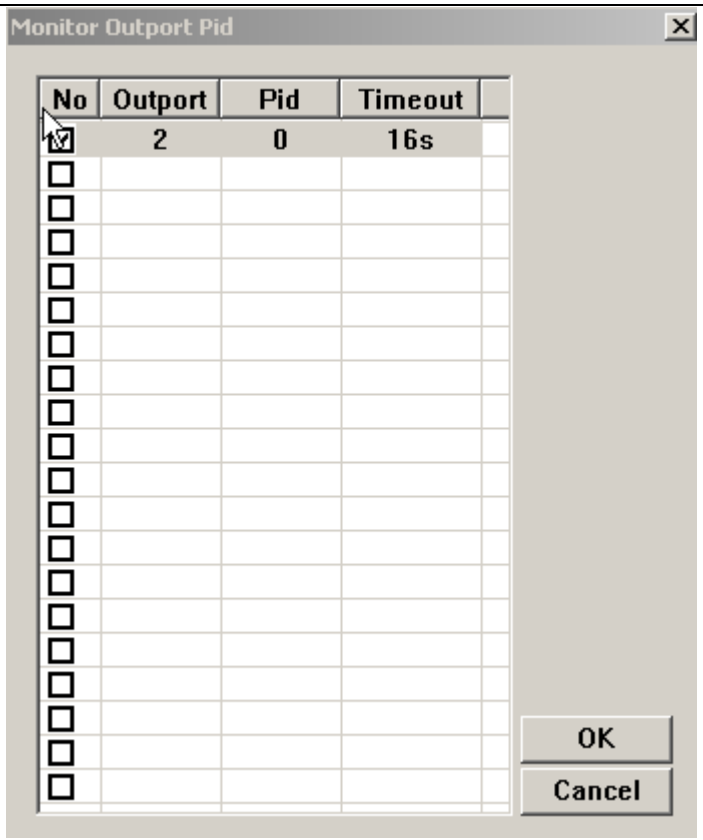


Figure 3-16

In the figure above, write the designated PID value into PID column, “Timeout” is how long to test once, the “Outport” is the PID which was locked in No.1 port or No.2 port, click “OK” to save (This function is used to monitor the PID), if the output port has designated PID lost, the “PID lost” indicator light will turn red.

3.2 M216 Advanced operation

3.2.1 Transfer service information

The M216 can edit and send NIT、SDT of service information（SI）,or it may send other service information.

1、Select a port which input service information（SI）,such as figure 3-28,select “1”.

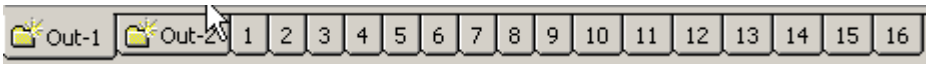


Figure 3-28

2、If import ‘ ’ is green, it show the port is opened, if the ‘ ’ is gray, it show the import need to be opened. Right click Inport-1, select ‘open port’, such as figure3-29.

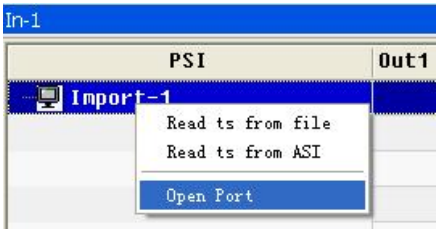


Figure 3-29

3、After opening port, right click import, select ‘Read ts from ASI’. Figure as 3-30.

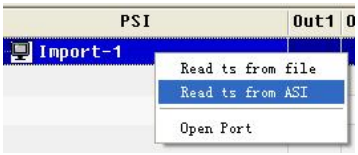


Figure 3-30

4、After reading SI information from M216 import, such as3-31, NIT、SDT/BAT、EIT、TDT/TOT/ST have been displayed in ‘All pids’, right click one table which need to transfer, then select ‘Transfer’.

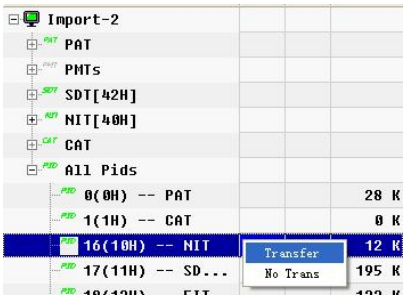


Figure 3-31

5、After reading import information, enter outport, such as figure3-32.

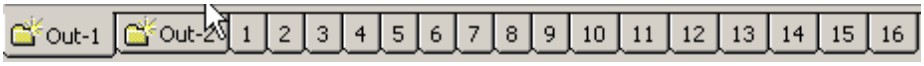


Figure 3-32

6、Click‘other pids’,some of SI have been displayed in outport.

7、Right click ‘SDT’, such as figure 3-33, then left click ‘√Send SDT’,it show SDT will be send by M216. Otherwise select ‘Send SDT’.

Figure 3-33

[Note]

EN300 468 standard define all of PID table in SI,so in a same channel there are different SI. When transfer outer SI, close to send SDT and NIT which send by M216.

8、Right click ‘NIT’, such as figure3-34,select‘√Send NIT’,it show NIT table will be send by M216.otherwise select‘Send NIT’.

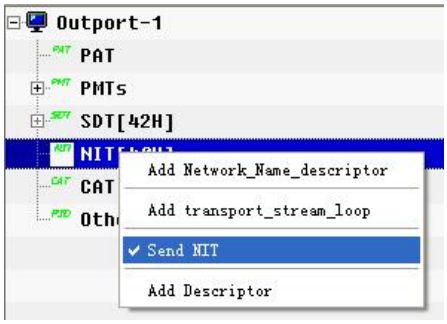


Figure 3-34

9、Click “” to save these parameters.

3.2.2 Edit NIT

M216 can edit and send NIT information.

1 Select outport, such as figure 3-35.

[Note] from 2-4 steps add network name describe, the describe may not do it.

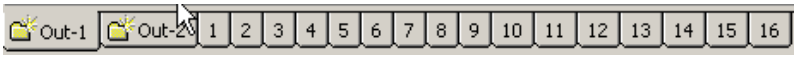


Figure3-35

2 Right click 'NIT', select 'add Network_Name_descriptor', such as figure 3-36

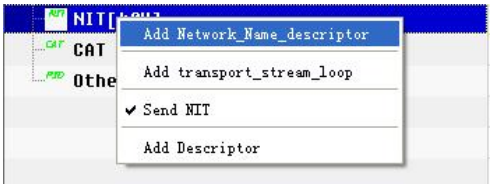


Figure3-36

3 Select 'Network Name Descriptor', such as figure 3-37.

Figure3-37

4 Fill in network name in 'Network Name Descriptor', such as figure 3-38.

Figure 3-38

5 Right key then select 'add transport_stream_loop', such as figure 3-39

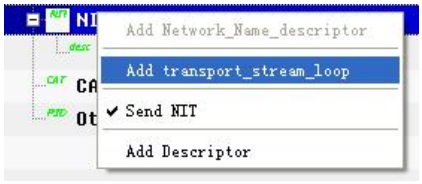


Figure3-39

6 Such as figure3-40,right click new stream then select ‘trans_stream_id=…’
Cable Delivery System Descriptor
Satellite Delivery System Descriptor
Service List Descriptor

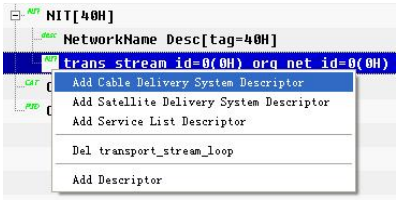


Figure3-40

7 Select “cable delivery ststem descriptor”, such as figure 3-41.

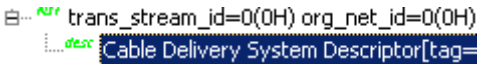
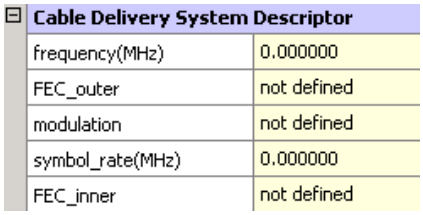


Figure3-41

8 Fill in parameters in ‘cable delivery system descriptor’, such as figure 3-43.



Cable Delivery System Descriptor	
frequency(MHz)	0.000000
FEC_outer	not defined
modulation	not defined
symbol_rate(MHz)	0.000000
FEC_inner	not defined

Figure3-43

Note: these parameters are responding to Modulator which connect with the M216.

Suggestion to FEC_inner: commonly select “not defined”

Suggestion to FEC_outer: commonly select “RS (204/188)”

9 Repeat to operate from figure3-37 to figure3-43, such as figure 3-44

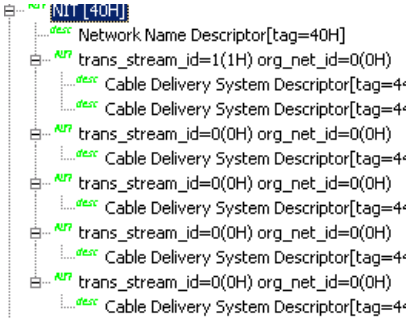


Figure3-44

10 Click “” to save these parameters.

3.2.3 Add private description

M216 support to add private description in PSI and SI, it can send another stream.

1 At first click outport ,select out-1, for example figure3-45.

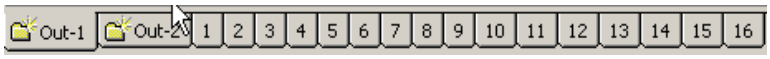


Figure 3-45

2 Select one PMT on outport and add some descriptors, right key click one PMT stream, the interface is shown as firgure3-46, select 'Add Descriptor'

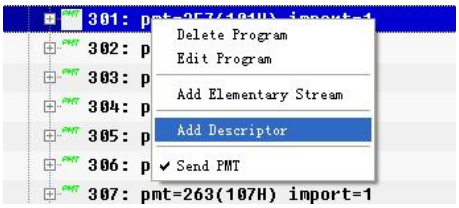


Figure 3-46

3 Click "Add Descriptor", the interface is shown as figure3-47,input Tag Data Len in the figure.

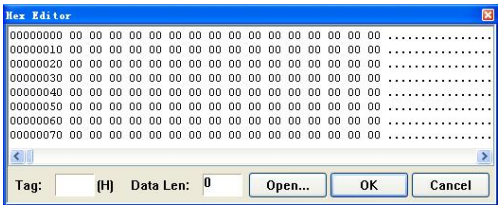


Figure 3-47

4 Click" " to save these parameters.

3.2.4 Stream assembled

The M216 support to regroup bitrate streams and edit a new program transport stream,or add some element stream to program transport stream.

1 Select outport, for example figure3-48.

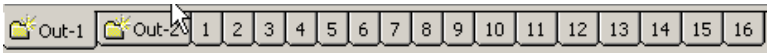


Figure 3-48

2 Right key click stream which need to add elementary stream, for example figure3-49, click 'Add Elementary Stream' in the menu.

Note: new elementary stream is from ASI import or Ethernet.

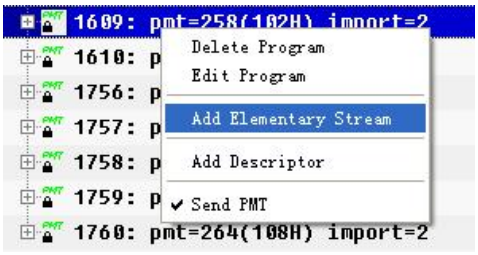


Figure 3-49

3 Pop the edit elementary stream figure, for example figure3-50, input importNo, Org Stream Pid, Org Stream Type in it, then click 'ok'.

Figure 3-50

4 Click "" to save these parameters.

Appendix A M216 panel operation introduce

A-1 Front panel describe

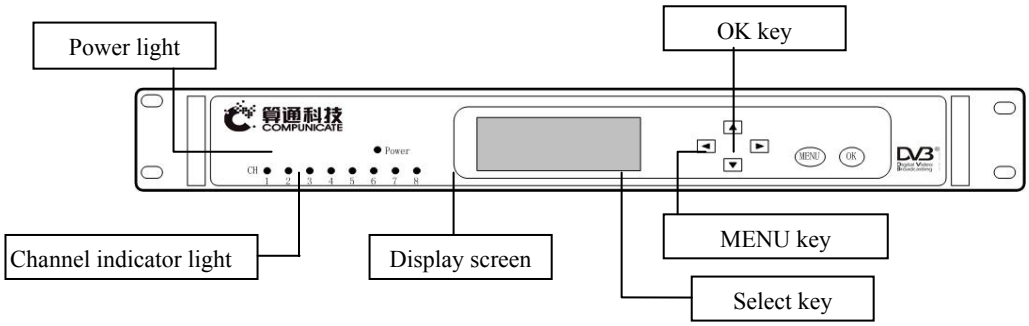


Figure A-1

- power：power supply work indicator light,when green light on that the system is normal.
- channel indicator light：Display 8 channel status. These status describe is shown as appendixA-10.
- Display screen：Display the system state and menu setting.
- select key：▲▼◄►, ▲▼ key is used to switch up/down menu and add/decrease number, ◄► key is used to change numbers.
- MENU key：enter or exit operation.
- OK key：make sure the operation.

A-2 Menu structure

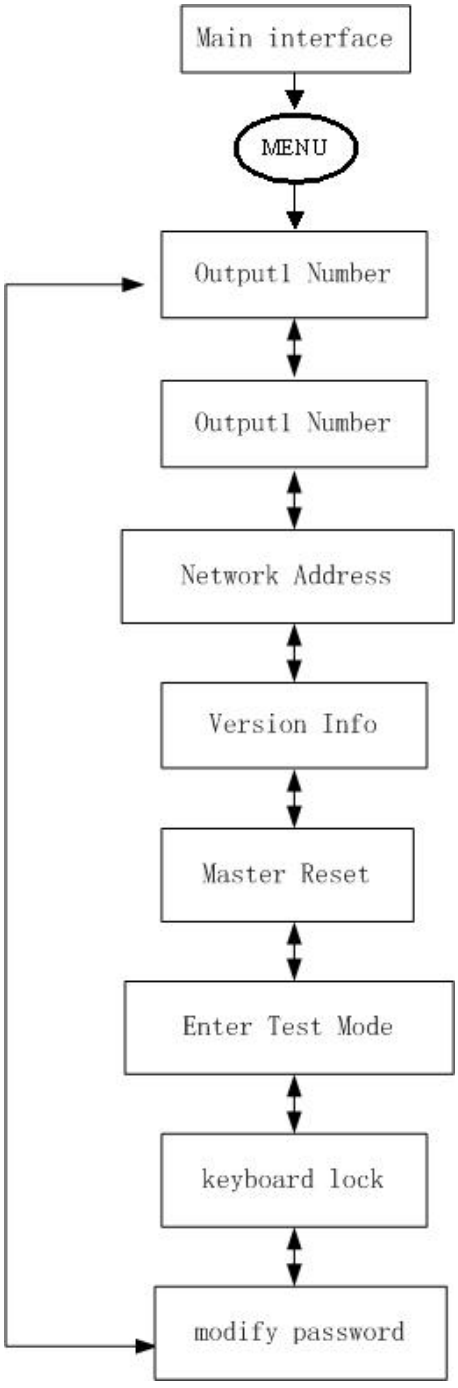


Figure A-2

Main interface：display the multiplexer running state, turn on the power, after initializating,the system enter the interface. Or if not press the key during thirty seconds, the system interface automatically switch the main interface.

Main interface

01#	p03	bitrat000.0
02#	p04	bitrat000.0

01#, 02#: Outport number, setting outport number is shown as appendixA-5.
p03, p04:Output program number
Bitrat000.0: Outport real time output effective bitrate
For example：01# p03 bitrat015.0, it mean outport 1 have three programs and output bitrate is 15Mbps

output1 number：Modify output1 number
output2 number：Modify output2 number

Network address：Setting network IP address, setting steps is shown as appendixA－4

Version info：Display equipment version information

Master reset：Return to original parameters, setting step is shown as appendix A－8.

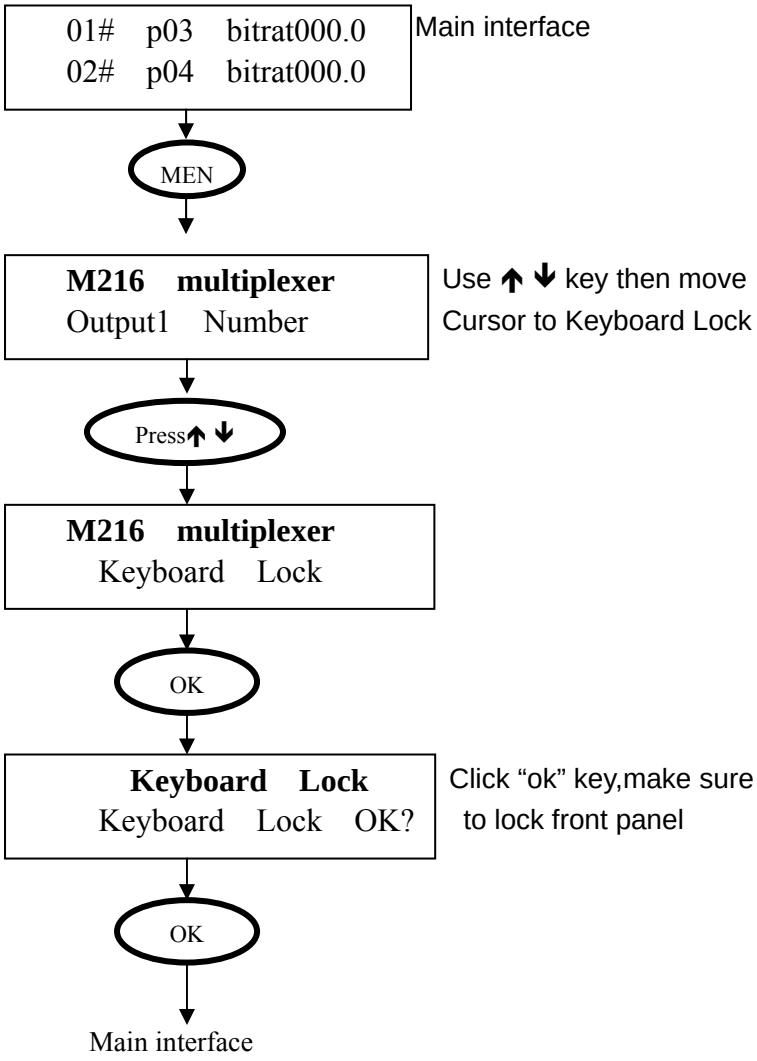
Test mode：It is a kind of work mode, setting steps is shown as appendix A－6

Keyboard lock：Setting the keyboard lock, setting steps is shown as appendix A－3.

Modify password：Setting unlock password, setting steps is shown as appendix A－7

A-3 Keyboard Lock

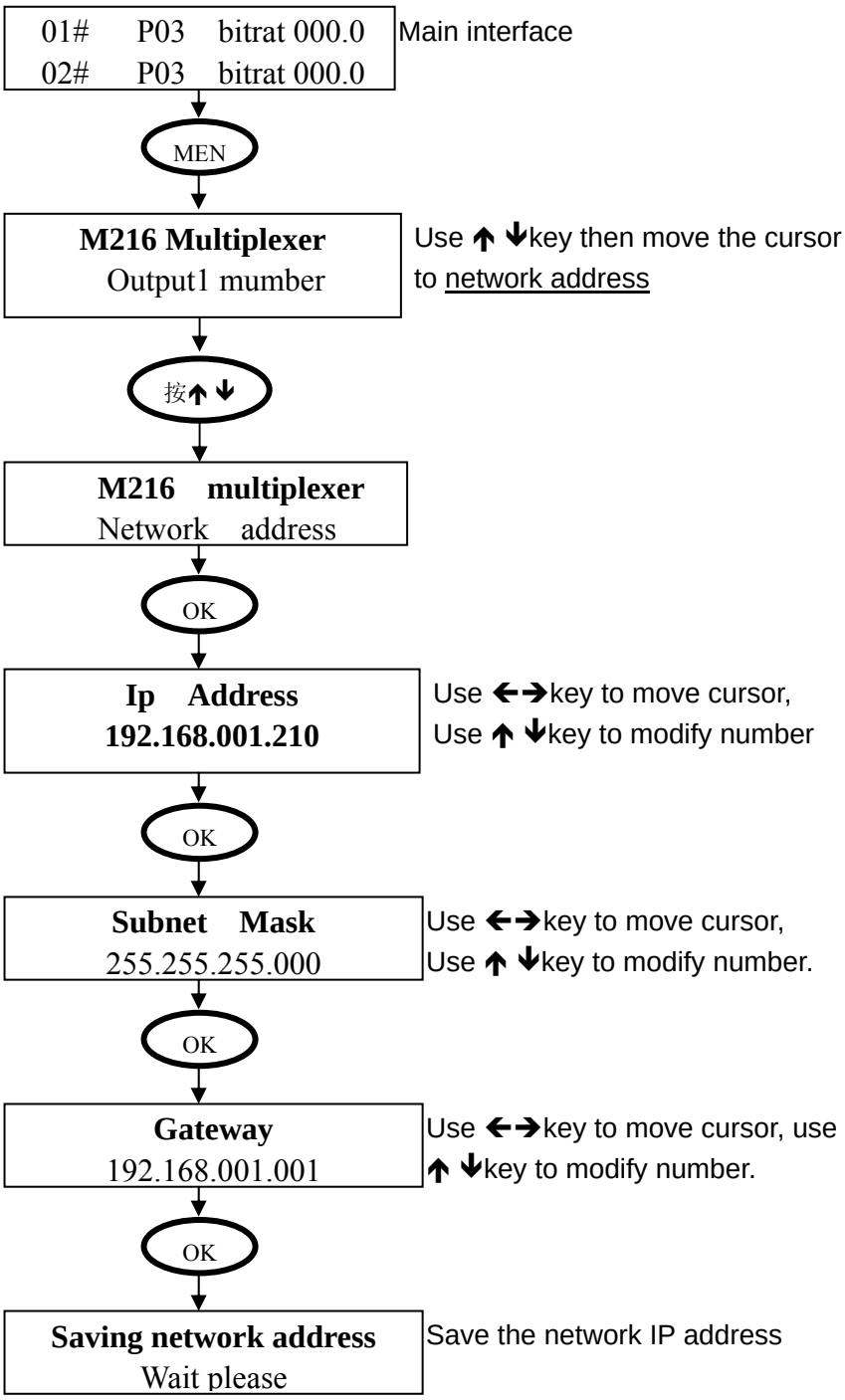
Make sure operate safely by Keyboard lock



When the front panel is locked, if need operate by front panel, it will enter to unlock status at first. Unlock original password is ↑↑↑↓↓↓↓↓,if need to modify the unlock password, please look up appendix A－7.

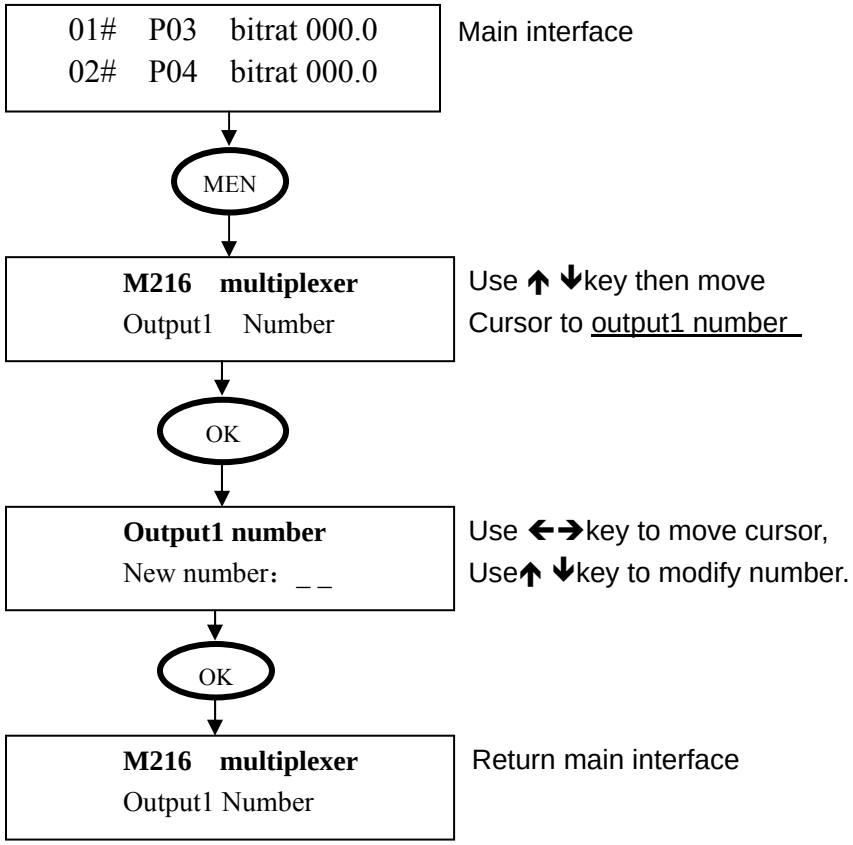
A-4 Network Address

Setting network address is that modify multiplexer IP address, its IP address/subnet mask/gateway is same as local area network.



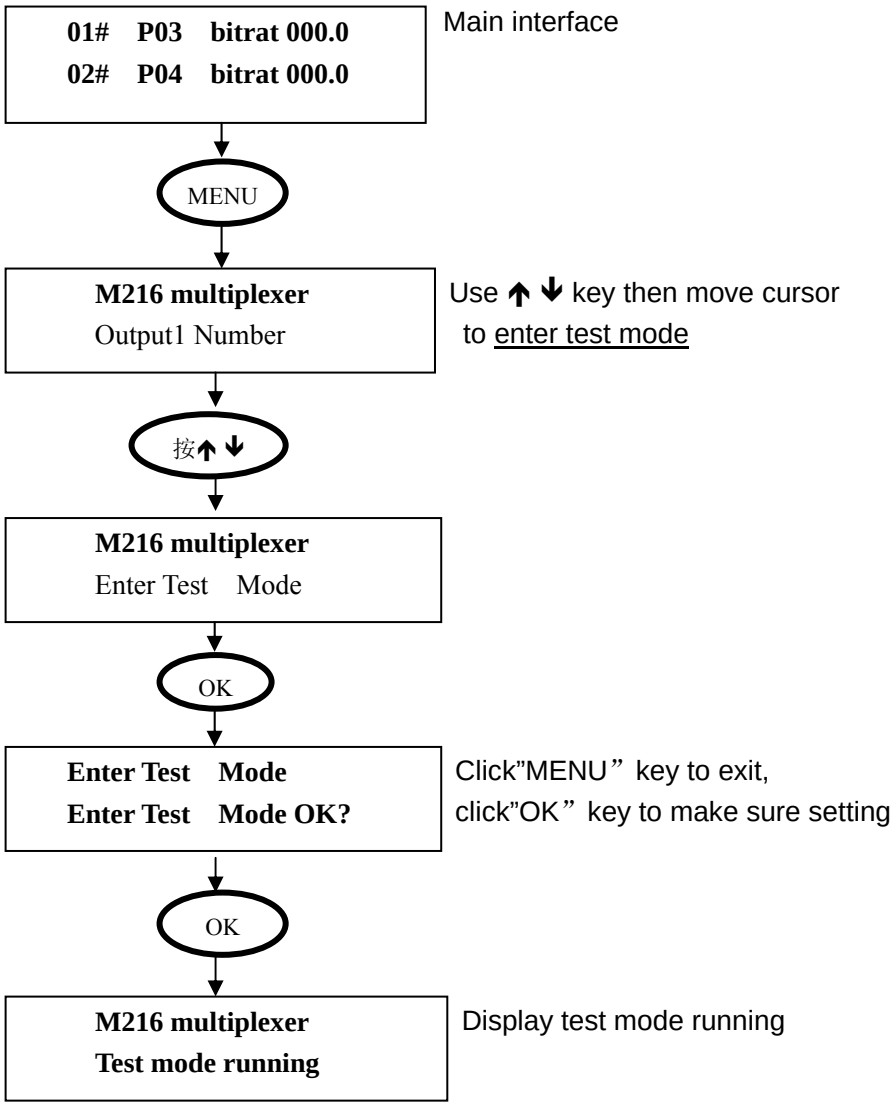
A-5 Output number

Setting Output number is modify multiplexer outport number, for example setting output1 number



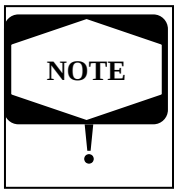
A-6 Test mode

Note：When setting test mode, input port will select a program to send outport and output, until turn on the equipment again to return original work mode.

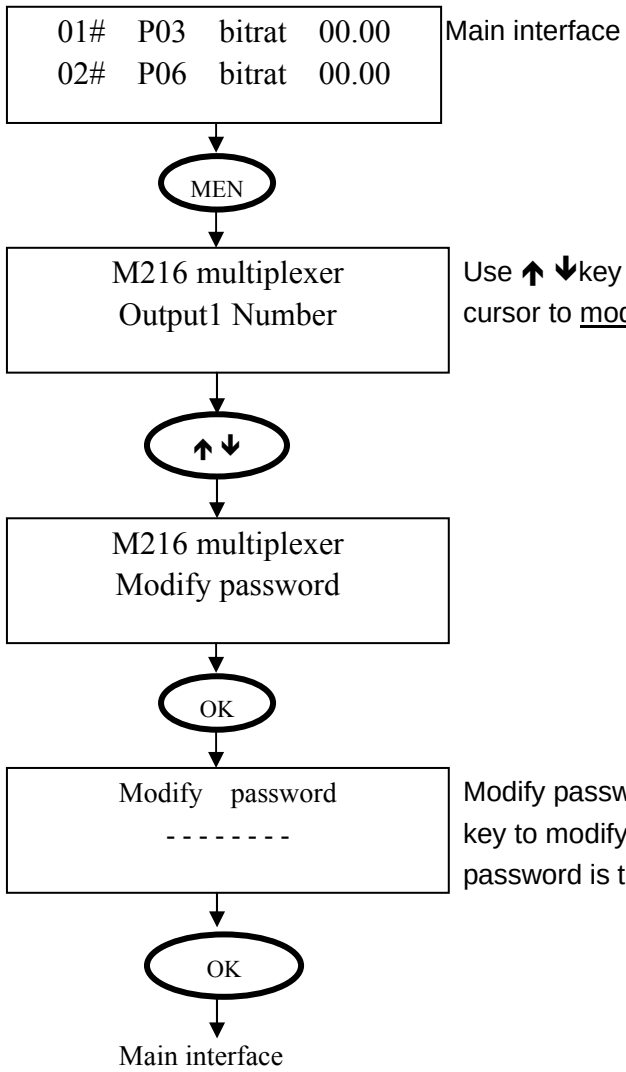


When equipment setting test mode, front panel key can not be worked, until turn on again the equipment parameters return original status.

A-7 Modify password

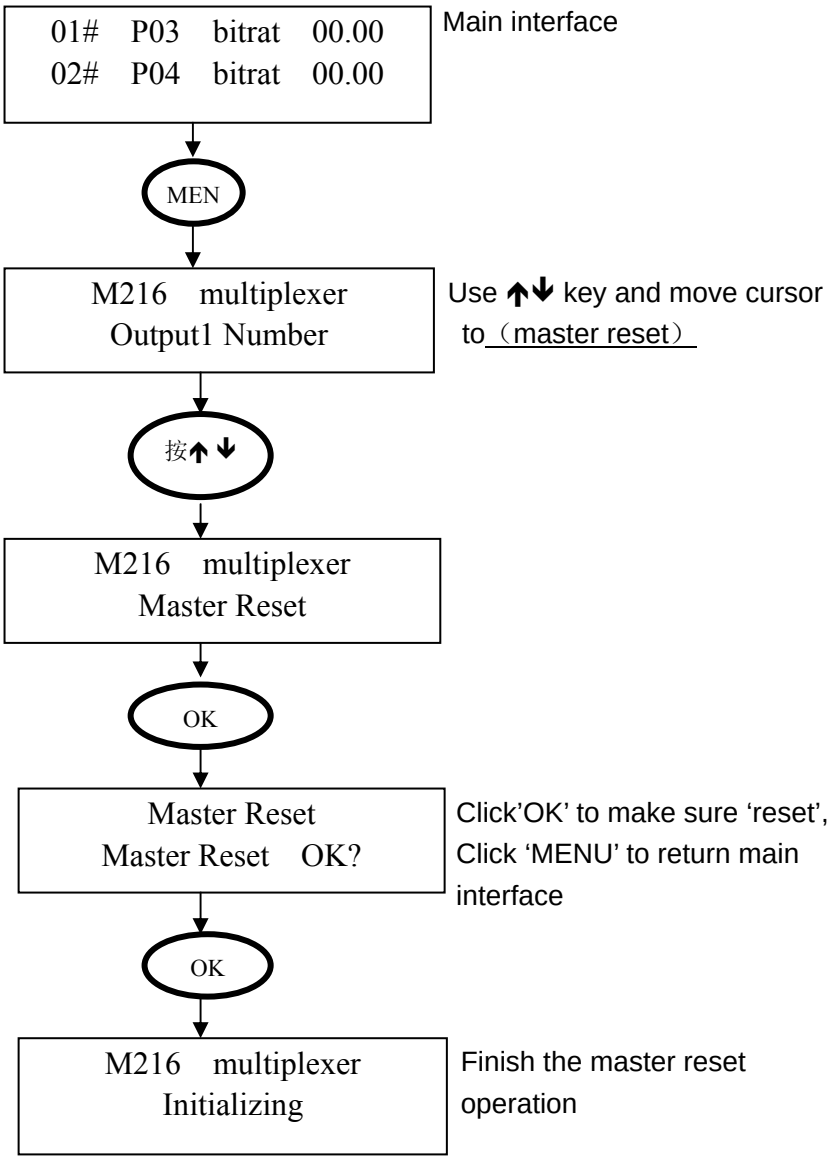


- *Front-pane password is modified by manager then please remember the password.*
- *once forget password, please chat with equipment provider soon.*



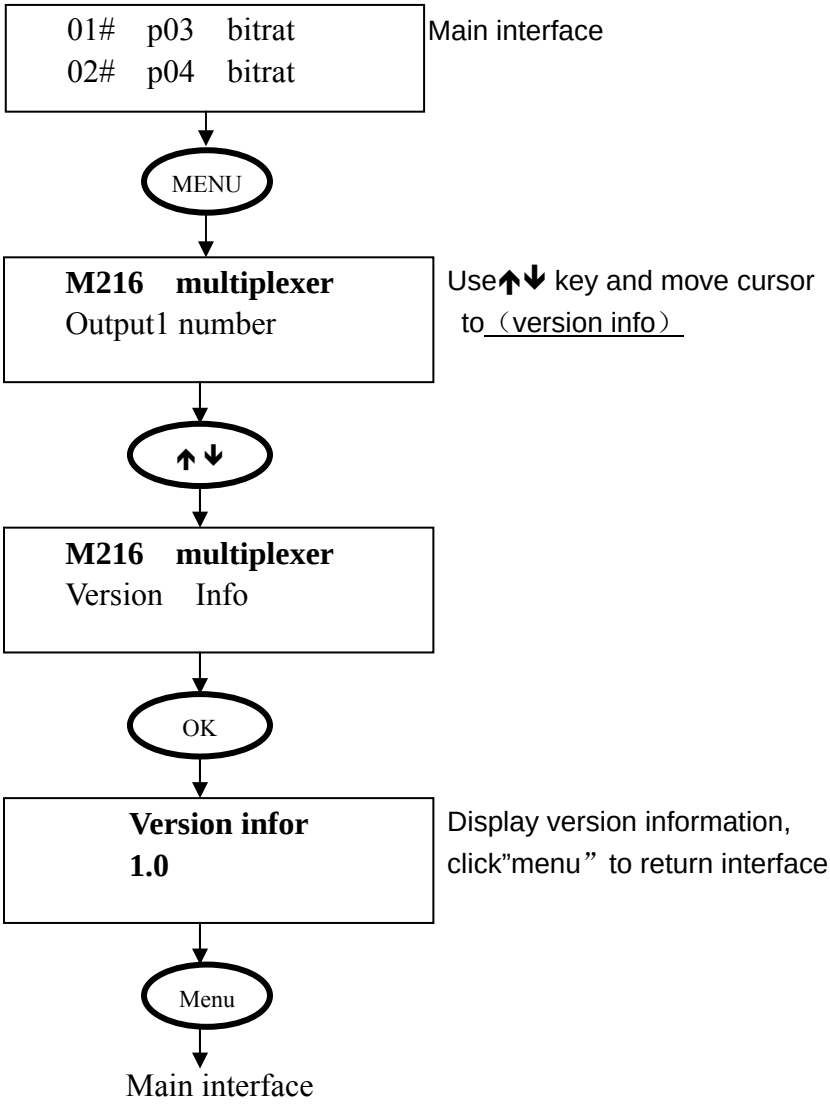
A-8 Master Reset

Once operate the item, it will clean out parameter which you make over, please carefully use the operation.



A-9 Version Info

Version info display the M216 version status information



A-10 Alarm information

Indicator light states	Input channels states
Green light shine	Input information locked, channels port opened
Green light twinkle	Input information but channels port unopened
Red light shine	Input bitrate overflow or input port opened but no signal input
Light dark	No input signal or open input port

Appendix B Noun Abbreviations

A ASI: Asynchronism serial interface

B BAT: Bouquet Association Table

C CAT: Condition Access Table

M MPTS: Multiple Programs Transport Stream

N NIT: Net work Information Table

P PAT: Program Association Table

PCR: Program Clock Reference

PID: Packet Identifier

PMT: Program Map Table

PSI: Program Specific Information

S SDT: Service Description Table

SI: Service Information

SPTS: Single Program Transport Stream

T TDT: Time and Date Table

TS: Transport_stream